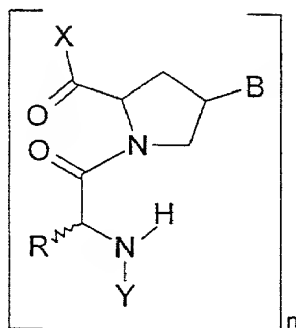


CLAIMS

- 5 1. A compound of formula (I):



(I)

where n is 1 or 2-200,

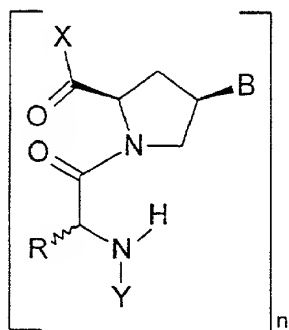
B is a protected or unprotected base capable of Watson-Crick or of Hoogsteen pairing,

- 10 R is H, C<sub>1</sub> - C<sub>12</sub> alkyl, C<sub>6</sub> - C<sub>12</sub> aralkyl or C<sub>6</sub> - C<sub>12</sub> heteroaryl which may carry one or more substituents preferably selected from hydroxyl, carboxyl, amine, amide, thiol, thioether or phenol.

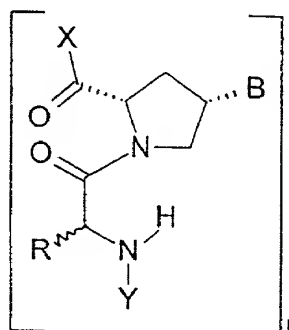
X is OH or OR' where R' is a protecting group or an activating group or a lipophilic group or an amino acid or amino amide or nucleoside,

- 15 Y is H or a protecting group or a lipophilic group or an amino acyl group or nucleoside.

2. A compound as claimed in claim 1, wherein the structure is (II) or (III) where n, B, R, X and Y are as defined in claim 1.



(II)



(III)

3. A compound as claimed in claim 1 or claim 2, wherein B is a naturally occurring nucleobase selected from adenine, cytosine, guanine, thymine and uracil.
4. A compound as claimed in any one of claims 1 to 3, wherein -CO-CHR-NH- is a residue of a naturally occurring amino acid.
5. A compound as claimed in any one of claims 1 to 4, wherein R is CH<sub>2</sub>OH or (CH<sub>2</sub>)<sub>4</sub>NH<sub>2</sub> or H.
6. A compound as claimed in claim 1, wherein n is 1,
- B is a naturally occurring nucleobase selected from adenine, cytosine, guanine, thymine and uracil.,
- R is H or CH<sub>2</sub>OH or (CH<sub>2</sub>)<sub>4</sub>NH<sub>2</sub>.
7. X is OH or OR',
- R' is an activating group for example pentafluorophenyl,
- Y is H or a protecting group for example Fmoc.
8. A compound as claimed in any one of claims 1 to 5, wherein n is 2-200 preferably 5-30.
9. A hybrid comprising two strands of which a first strand is a compound according to claim 7 and a second strand is an oligo- or polynucleotide or nucleic acid.

9. A hybrid as claimed in claim 8, wherein the two strands are hybridised to one another in a 1:1 molar ratio by base-specific Watson-Crick base pairing.

10. A method of making the peptide nucleotide analogue of  
5 formula (I), comprising the steps of:
- a) reacting an N-protected C-protected 4-hydroxy proline with a base selected from N<sub>3</sub>-protected thymine, N<sub>6</sub>-protected adenine, N<sub>4</sub>-protected cytosine, N<sub>2</sub>-O<sub>6</sub>-protected guanine and N<sub>3</sub>-protected uracil.
  - b) deprotecting the proline amino group of the product of a),
  - 10 c) reacting the product of b) with an N-protected amino acid,
  - d) optionally removing protecting groups from the product of c).

11. A method as claimed in claim 10, wherein in a) 4-hydroxyproline in the form of a N-Boc/Dpm ester is reacted with N<sub>3</sub>-benzoyl thymine, N<sub>6</sub>-benzoyl adenine, N<sub>4</sub>-benzoyl cytosine, N<sub>2</sub>-benzoyl-  
15 O<sub>6</sub>-(4'-nitrophenylethyl)guanine or N<sub>3</sub>-benzoyl uracil, and in c) an Fmoc amino acid ester is used.

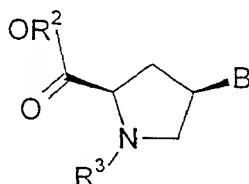
12. A method as claimed in claim 10 or claim 11, wherein an N-protected C-protected trans-4-hydroxy proline is used in a).

13. A method of converting a peptide nucleotide analogue of  
20 formula (I) in which n is 1 into a peptide oligonucleotide of formula (I) in which n is 2-200, comprising the steps of:

- i) providing a support carrying primary amine groups,
- ii) coupling an N-protected peptide nucleotide analogue of formula (I) to the support,
- 25 iii) removing the N-protecting group,
- iv) coupling an N-protected nucleotide analogue of formula (I) to the thus-derivatised support,
- v) repeating steps iii) and iv) one or more times, and
- vi) optionally removing the resulting peptide oligonucleotide from  
30 the support.

14. A method as claimed in claim 13, wherein a pentafluorophenyl ester of the peptide nucleotide analogue is used in step ii) and iii).

15. A compound of formula (IV)



(IV)

5

where R<sup>2</sup> is H or a protecting group,

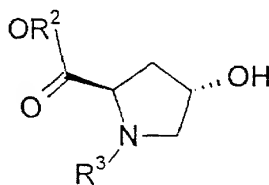
R<sup>3</sup> is H or a protecting group compatible with R<sup>2</sup>, and

B is a protected or unprotected heterocyclic base.

16. A compound as claimed in claim 15, wherein R<sup>2</sup> is  
10 diphenylmethyl and R<sup>3</sup> is t-butoxycarbonyl.

17. A compound as claimed in claim 15 or claim 16, wherein B is a protected or unprotected nucleobase selected from adenine, cytosine, guanine, thymine and uracil.

18. A compound of formula (V)



(V)

15

where R<sup>2</sup> is diphenylmethyl, and

R<sup>3</sup> is t-butoxycarbonyl.

19. A compound as claimed in any one of claims 1 to 7, wherein at least one of B, R, X and Y includes a signal moiety.